



Endangered Plants?

An endangered plant is a species that is at high risk of extinction in the near future throughout all or a significant portion of its range. According to the International Union for Conservation of Nature (IUCN), a plant species is considered endangered when its population has decreased by more than 50% over the last three generations, or when it faces serious threats that could soon lead to its disappearance.

The main causes that lead to plants becoming endangere d include:

Habitat Destruction: Urbanization, agriculture, mining, and road construction destroy or fragment plant habitats, leaving them unable to survive.

Overgrazing: Excessive grazing by domestic animals such as camels, goats, and sheep damages young shoots and prevents regeneration.

Overexploitation: Some plants are harvested unsustainably for food, medicine, or ornamental purposes.

Climate Change: Changes in rainfall patterns, rising temperatures, and droughts alter ecosystems, making it difficult for plants to adapt.

Pollution: Chemical pollutants from industries and agriculture can poison soils and water, affecting plant growth.

Invasive Species: Non-native plants may outcompete native species for water, nutrients, and sunlight.



Rare Plants

A rare plant is a species that has a very small population size or is found only in a limited geographical area, but it may not yet be classified as endangered or threatened. **Rare plants** are naturally uncommon, and their populations are often small because they have very specific habitat requirements or limited distribution.

Endangered vs Rare Plants

Aspect	Endangered Plants	Rare Plants	
Definition	Species at high risk of extinction soon	Species with small populations or limited distribution	
Population Trend	Rapidly declining	Stable but naturally small	
Threat Level	Very high	Moderate to low, but can increase	
Examples	Juniperus procera, Dracaena cinnabari	Aloe rubroviolacea, Boswellia sacra	
Conservation Priority	Urgent protection required	Monitoring and habitat conservation needed	

The Kingdom of Saudi Arabia (KSA) is recognized for its diverse landscapes, including saltmarshes, sand dunes, desert plains, ancient lava fields, and mountains, which support a variety of plant species, some of which are rare and endangered.

Despite its arid environment, Saudi Arabia harbors approximately 2,253 plant species, with about 30% considered rare and around 18 plant species thought to be locally extinct.

Conservation of these plant genetic resources is crucial for maintaining biodiversity and ecosystem stability. There is not (historically) a single, fully comprehensive national Red List of all Saudi plants publicly available, but regional assessments, inventories and IUCN reviews cover many taxa; protected area coverage and national conservation initiatives have increased in recent years.



Several studies have focused on documenting and assessing the diversity of plant species across different regions and habitats in Saudi Arabia. For example, a study in Wadi Ar'ar aimed to provide a list of wild plants, analyzing their life forms, lifespan, and chorotypes in four fenced areas: Aoasa, Mayla, Goraba, and Aqra.



Another inventory in the **Southwest Al-Baha** region, a hotspot area, evaluated the natural plant species within a **167.6** km² area. The diversity of invasive alien species and their relationship with edaphic variables have also been examined in the western region of **Saudi Arabia** across **58** stands in various habitats, including **mountains**, **protected areas**, **wadis**, **coastal areas**, **farmlands**, **and ruderal areas**.

Endangered and rare plant species in **Saudi Arabia** are organized by location. The percentage of endangered and rare species is very high in **Saudi Arabia**, where nearly **600 species** are considered to be rare or endangered. Losses in the Kingdom's flora may be higher than in any other country in the Middle East.

Many of the rarest species are concentrated in the southwestern mountainous regions and other isolated or unique habitats.

Southwestern mountains (Asir, Al Baha): The varied habitats in Saudi Arabia's western and southwestern regions contain a high density of rare and endemic flora.

- Breonadia salicina (Critically Endangered): This tree species is native to southwestern **Saudi Arabia** and is found in several wadis and on rocky slopes. Specific populations have been identified in **Wadi Lajab** and the **Rabuaa area**, including near the "**Wadi Afkah**".
- Centaurothamnus maximus (Rare Endemic): A shrub endemic to the **Arabian Peninsula**, this species is exceptionally rare. It has only been found in two locations in **Saudi Arabia** within the mountainous **Asir region**.

- Aloe shadensis (Endangered Endemic): This succulent is an endemic species, found in the narrow region around the Shada Mountains (Jabal Shada) in the Al Baha region.
- Boscia angustifolia (Critically Endangered): An extremely rare tree, often found as a single individual or in very few locations. It has been observed on inaccessible rocky slopes in the **Al Baha region**.
- Adenium obesum (Rare Endemic): Known as the desert rose, this rare endemic succulent is found in the **Shada Mountains**, where it grows in granite massifs.
- Teclea nobilis (Very Rare): A tree found in the Al Baha region, with very limited occurrences.

Northwestern mountains (Jabal Lawz, Jabal Dabbagh): The mountains in the northern Hijaz contain varied vegetation, including species with Mediterranean and Irano-Turanian affinities.

- Prunus korshinskyi (Vulnerable): This species is found at high altitudes on **Jabal Lawz**, the highest mountain in the northern **Hijaz**. Only a few plants are known to exist in this area.
- Tulipa biflora (Rare): One of the last remaining populations of this tulip in Saudi Arabia exists on Jabal Dabbagh, a granite mountain in the northwest.
- Dolichorynchus arabicus (Endemic): The only known species of this genus, it is endemic to **Jabal Dabbagh**, a key biodiversity hotspot.
- Nepeta sheilae (Endemic): This endemic herb is also found in mountainous areas, including the biodiversity hotspot of **Jabal Dabbagh**.

Red Sea Coast and Islands: The Red Sea coast and islands are characterized by unique coastal vegetation, including species adapted to saline, coral-based soils.

- Commiphora erythraea (Rare): This tree is common in Northeast Africa, but in the Arabian region, it is known only from **Dumsuk Island**, a tiny uninhabited island off the **Red Sea** coast of Saudi Arabia.
- Kickxia corallicola (Endemic): An endemic annual herb that climbs on shrubs in the Farasan Islands and along the mainland Red Sea coast, particularly in the Jizan Province.

Northern regions: The Northern Borders region, especially areas near Arar, hosts unique flora adapted to arid conditions.

• Hazaa plant (Apiaceae family): This perennial plant is known to flourish in the northern deserts, particularly near **Arar**, after seasonal floods. It is adapted to handle drought and salinity.

Other locations and general distribution: Some species have wider distributions but are still rare within Saudi Arabia.

Ziziphus mucronata (Critically Endangered): While more widespread in Africa, this tree is rare within the **Arabian Peninsula**. It can be found in a variety of habitats, including woodlands and scrubland, often indicating the presence of underground water.

Faidherbia albida (Rare): This culturally significant tree is found in only a few isolated locations throughout the Middle East, including Saudi Arabia.

A comprehensive list of endangered plant species in **Saudi Arabia** can be found on the reference site **Plant Diversity of Saudi Arabia**;

https://plantdiversityofsaudiarabia.info/endanger ed-species/

This resource, developed by Saudi researchers and botanists, provides detailed scientific information, photographs, and conservation status for numerous threatened plants across different regions of the Kingdom.



Some notable examples of endangered/rare plant species listed include:

Common Name	Scientific Name	Status	Region / Habitat	Main Threats
Juniper Tree	Juniperus procera	Endangered	Asir Mountains and Taif highlands	Deforestation, overcutting, climate change
Wild Olive Tree	Olea europaea subsp. cuspidata	Endangered	Southwestern mountain forests	Agricultural expansion, firewood collection
Arabian Aloe	Aloe rubroviolacea	Rare	Jazan and Asir Mountains	Overcollection
Arabian Primrose	Arnebia hispidissima	Endangered	Rocky and mountainous areas of western Saudi Arabia	Overgrazing, land degradation
Desert Gourd	Citrullus colocynthis	Rare	Central and northern deserts	Habitat disturbance, overuse
Acacia gerrardii	Acacia gerrardii	Endangered	Central and western regions	Drought, overgrazing
Dragon's Blood Tree	Dracaena cinnabari	Endngered	Southern Arabian Peninsula (border region)	Habitat loss, reduced rainfall
Rhanterium (Arfaj)	Rhanterium epapposum	Threatened	Central deserts	Overgrazing, vehicle movement

Threats to Plant Biodiversity in Saudi Arabia

Rare plant species in Saudi Arabia's arid regions face multiple significant threats, primarily stemming from environmental changes and human activities. The primary threats to Saudi Arabia's plant life include:

- > Invasion of exotic plant species
- > Habitat degradation and loss
- > Climate change
- > Overexploitation
- Lack of comprehensive conservation assessments and targeted strategies



One of the most pressing threats is the invasion of exotic plant species.

Invasive alien plants pose a major global environmental challenge and are a leading cause of plant diversity loss.

Invasion of exotic plant species

In Saudi Arabia, the continuous increase in the number of invasive species creates significant problems, as native flora and agricultural crops often cannot compete effectively with them. This competition can disrupt the structure and function of ecosystems.

For instance, a study in the western region of Saudi Arabia identified 146 plant species, highlighting the presence of both native and alien species across various habitats including mountains, protected areas, wadis, coastal areas, farmlands, and ruderal areas. The introduction of new species like *Tropaeolum maju*sin damp, semi-shaded habitats at elevations between 1800 and 2132 meters further exemplifies this threat.

Key invasive species include **Prosopis juliflora**, **Nicotiana glauca**, **Trianthema portulacastrum and Opuntia spp.**, which can out compete native vegetation, disrupt ecosystems, and alter soil properties.

Prosopis juliflora is a common, but highly invasive, species in **Saudi Arabia** that was introduced for landscaping and has since spread rapidly, especially in lowland and coastal areas with shallow water tables.

Nicotiana glauca or tree tobacco, is an invasive plant found in the mountainous and southwestern regions of **Saudi Arabia**. It has become a problematic weed, negatively impacting native vegetation and soil composition. Despite its toxicity and invasive nature, it has been historically used in traditional medicine, although its consumption can be fatal.

Trianthema portulacastrum or horse purslane is present in **Saudi Arabia** and is considered a highly invasive weed with potential to damage biodiversity and alter ecosystems. It is native to tropical and subtropical regions and has spread to **Saudi Arabia**, likely via the movement of water, soil, or contaminated imports.

Opuntia spp., in **Saudi Arabia**, *Opuntia spp.*, or prickly pear cactus, is a significant invasive species, particularly in the southwestern highlands, where it negatively impacts native forest ecosystems.



New growth of Nicotiana glauca in a disturbed area along the sides of road in Raida Escarpments, Abha



Farasan Islands: Prosopis juliflora invaded in a plant community dominated by Acacia ehrenbergiana



Opuntia stricta (Cactaceae) invaded along the eastern slopes of Raida Escarpments

Habitat degradation and loss

Habitat degradation and loss are also critical factors impacting rare plant species. Human activities, such as agricultural expansion and urban development, contribute to the degradation of natural habitats.

This is particularly relevant in arid environments, where sensitive ecosystems are easily disturbed.

Such activities can lead to the fragmentation of habitats, reducing the available space for rare and endemic species and isolating populations, which can hinder enetic exchange and increase vulnerability.



Growing population The world's population will reach 10bn in 2050.





Built-up surfaces

Natural landscapes are increasingly replaced by built-up structures, resulting in habitat fragmentation and loss of biodiversity.



Soil erosion and flooding degrade ecosystems by depleting soil health, damaging habitats, and threatening biodiversity.





Transportation

Pollution and rising emissions associated with transportation adversely impact ecosystem services.



Deforstation & habitat fragmentaion

Deforestation leads to loss of species, reduced genetic diversity, and overall decline in biodiversity.



Urban-driven threats to biodiversity



Air pollution

water quality is a vatal factor

for species to thrif in a given

increased level of water

area. urbanisation has lead to

urbanised areas have elevated level of air pollution due to human activities.



Changing climate conditions degrade soil health, disrupting biodiversity.



habitats and threatening



Noise pollution & ALAN

Urban noise pollution has been pointed as a significant disruptor of wildlife communication systems. likewise, exposure to artificial light at night (ALAN) has been found to interfere with circadian rhythms and other critical physiological and behavioral processes.

Water pollution

pollution.

Island heat

The phenomena that elevates temperatures, leading to habitat damage, altered species distribution, and lead to biodiversity loss.



Source: https://www.frontiersin.org/journals/sustainable-cities/articles/10.3389/frsc.2025.1636228/full

Climate change

Climate change affects Saudi Arabia's plant diversity through increased heat, drought, and extreme weather, which can lead to changes in species composition, plant decline, and the loss of rare plants.

Specific details from the provided literature on its direct impact on Saudi Arabian rare plants are not extensively detailed, it is generally acknowledged as a challenge to plant conservation.

The arid conditions of **Saudi Arabia** make its flora particularly sensitive to shifts in temperature and precipitation patterns.

Saudi Arabia's woodlands have experienced extensive dieback in recent decades, particularly at lower elevations where heat stress is more pronounced. This includes the once-healthy forests of *Juniperus procera*. The decline is projected to lead to a shift toward younger forests and a reorganization of species composition.





Overexploitation

Overexploitation of medicinal plants in Saudi Arabia is a significant threat due to overharvesting, habitat loss from urbanization and agriculture, and overgrazing. This has led to the reduction of plant populations and the potential loss of traditional knowledge.

Overexploitation, particularly of medicinal plants, can pose a threat. Many rare species are also medicinal, increasing their vulnerability to unsustainable harvesting. A preliminary survey identified 86 medicinal species across seven families in Saudi Arabia, underscoring the importance of these plants as biological resources. Without proper regulation and sustainable practices, this can lead to further declines in rare plant populations.

Uncontrolled grazing by animals, especially camels, damages vegetation and consumes new shoots and seedlings, hindering regeneration.



Overexploitation



Lack of comprehensive conservation assessments and targeted strategies

The lack of comprehensive conservation assessments and targeted strategies for many rare and medicinal plant species presents an ongoing challenge in Saudi Arabia, due to a shortage of ecological data like distribution and population size, which hinders assessments for many species.

Key gaps in plant conservation assessment

- Incomplete species records: Existing data suffer from collection biases, with some regions being over-sampled while vast, difficult-to-access areas in mountainous and desert regions are underrepresented. A 2025 study highlighted this issue for medicinal plants, noting that surveys often concentrate near researchers' residences or easily accessible areas.
- Lack of IUCN assessments: Saudi Arabia has an estimated 2,253 species of flowering plants, including 246 endemic species found nowhere else. However, comprehensive threat assessments using IUCN criteria have not been conducted for most of these species. This prevents the country from effectively prioritizing and reporting on biodiversity conservation efforts.

- ➤ Insufficient ecological data: Key information needed for proper conservation planning, such as species distribution, population sizes, and genetic diversity, is often missing. One 2025 study noted the "lack of ecological data" as a key hinderance to assessing the conservation status of Nabatean thyme, a species endemic to the region.
- ➤ Passive conservation within protected areas: While Saudi Arabia has a network of protected areas, some plant conservation within them is passive and lacks "active management, monitoring, or intervention". For example, a 2025 gap analysis found seven priority medicinal plant species were completely absent from existing protected areas.
- ➤ Under-representation in gene banks: A 2025 analysis of medicinal plants revealed that only 14% of these species had recorded accessions in gene banks, all in international ones. This highlights a major gap in the ex-situ (off-site) conservation strategy and the genetic diversity of these plants.

Saudi Arabia's Conservation Efforts

This gap is being addressed by organizations like the Royal Commission for AlUla (RCU), the National Center for Wildlife (NCW), and National Centre for Vegetation Cover (NCVC) which are beginning to conduct comprehensive biodiversity inventories and monitoring surveys to fill the data gaps for threatened and endemic species.



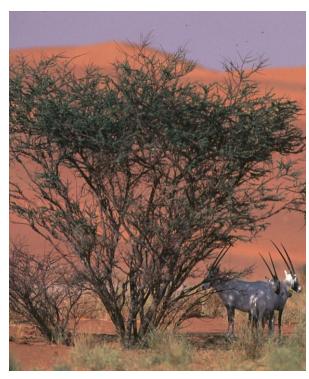
In recent years, Saudi Arabia has stepped up its commitment to environmental protection with major initiatives, but these are still in the early stages of closing the assessment gap.

Biodiversity surveys: Projects like the Wild Plant Survey and Analysis, launched in early 2025, aim to expand scientific knowledge of native plant species. Red Sea Global has also initiated terrestrial surveys to fill scientific gaps and enable greater protection for critical species and habitats.

Seed banks: To overcome the shortage of native plants for restoration, the RCU established the AlUla seed bank and nursery, which collected native seeds and produced seedlings for dozens of species since 2019.

Policy framework: Since the 1970s, the government has introduced legislation for conservation and the sustainable use of natural resources. These laws provide a legal framework for maintaining biodiversity and are enforced by specific organizations.

Government-led programs: The Royal Commission for AlUla (RCU), the National Center for Wildlife (NCW), and National Centre for Vegetation Cover (NCVC) are working to expand protected areas, conduct inventories, and restore habitats. The Saudi Green Initiative aims to plant 10 billion trees, with a framework to ensure these efforts are sustainable.



'Uruq Bani Ma'arid - Acacia tree

Protected areas are explicitly recognized as vital for biodiversity conservation in Saudi Arabia, which is home to approximately 2,253 plant species, with around 30% considered rare and 18 locally extinct. The establishment of such areas is a direct response to the global trend of increasing focus on biological diversity conservation.

For instance, the 'Uruq Bani Ma'arid area has been designated as an Important Plant Area (IPA) because of its high plant species diversity and the presence of endemic and threatened plants, making it a vital conservation site. This designation implies a level of protection aimed at preserving its unique flora.

Similarly, the **King Salman Park** in **Riyadh,** covering **340,000 m²**, serves as an important area for studying floristic structure and plant diversity, thereby influencing policymaking and conservation efforts. These examples suggest that the physical establishment of protected zones is a recognized strategy.

Selected References & Resources

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